Proteomic Pattern Analysis, a New Era of Screening Cancers

Eiad B. Kahwash, MD, Catalin Barbacioru, PhD, Daniel J Cowden, MD, Joel Saltz, MD, PhD
Department of Pathology, Ohio State University, Department of Biomedical Informatics, Ohio State University

Background: Cancer is the second leading cause of death among Americans. It is estimated that 1.28 million new Americans are diagnosed with cancer annually (1). The estimated overall annual cost of cancer being $171 Billion (1). Decreasing the costs of the screening and diagnostic tests will automatically decrease the total cost of cancer by limiting not only the direct medical costs but also by containing the indirect costs of morbidity and mortality. New screening and diagnostic tests are obviously needed. Screening methods are emerging in the evaluation of proteomic patterns. In proteomic pattern analysis, we can screen for not only one cancer but a chip may be able to screen for multiple cancers. New screening and diagnostic methods (2) investigated by NCI and FDA (3) (4) are correlating gene and protein expression patterns for early detection of cancer. Many papers have been published in the last 12 months (3) (4) (5) utilizing this new technique of molecular analysis in screening and diagnosing cancers with high sensitivity and specificity.

Methods: We calculate the costs of the most used methods to screen for all commonly screened cancers (Breast, Prostate, Colo-Rectal and Cervical-Uteri cancers). We compare that cost to the estimated cost of using the proteomic pattern analysis for one condition and predict costs savings with a proteomic chip capable of screening multiple cancers. We used both single Cournot model (inventories chosen first) and single period Bertrand model (costs are chosen first) for cost estimates of this nanotechnology (4) (6).

Results: If we screen all Americans above 40 years old for all cancers by proteomic pattern analysis, a one single test with an estimated cost of $150/per test (subject to decrease), the total cost will be ($ 17 billion), which is much less than the current totals ($57.1 Billion) for breast, prostate, colo-rectal and cervical-uteri cancers. The few cancers that we are able to screen for in the present time will be augmented by this mass screening mechanism.

Conclusions: If this single, non-invasive and quick analysis will be able to detect all cancers in early stages with high sensitivity and specificity, then it can replace all other screening tests, saving money, time, efforts and more importantly lives.

References

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